

CLAIMS

What is claimed is:

1. A tool comprising:
a base portion including a pattern to impress the pattern on a substrate; and
an electroless nickel layer deposited over the base portion.
2. The tool of claim 1, wherein the base portion comprises nickel.
3. The tool of claim 1, wherein the electroless nickel layer comprises a composite layer.
4. The tool of claim 3, wherein the composite layer includes electroless nickel and a reinforcement constituent chosen from the group consisting of silicon carbide, aluminum oxide, diamond particles, and polytetrafluoroethylene (PTFE).
5. The tool of claim 1, wherein the electroless nickel layer has been annealed.
6. The tool of claim 1, wherein the substrate is a package substrate.
7. The tool of claim 1, wherein the base comprises a nickel alloy.
8. The tool of claim 7, wherein the nickel alloy is chosen from the group consisting

of a nickel-cobalt (Ni-Co) alloy, a nickel-manganese (Ni-Mn) alloy, and a nickel-iron (Ni-Fe) alloy.

9. The tool of claim 1, wherein the electroless nickel layer comprises an electroless nickel-phosphorous layer.

10. The tool of claim 1, wherein the pattern is to pattern an interconnect structure.

11. A method comprising:

forming a mold including a pattern to pattern a substrate;

electrolessly depositing an electroless nickel layer over the mold;

depositing a metal layer over the electroless nickel layer; and

removing the mold from the electroless nickel layer.

12. The method of claim 11, wherein forming the mold comprises depositing a photoresist layer and using photolithography to create the pattern.

13. The method of claim 11, wherein forming the mold comprises depositing a silicon layer, and using photolithography to create the pattern.

14. The method of claim 11, wherein depositing a metal layer comprises electroplating.

15. The method of claim 11, wherein removing comprises manually removing the mold.
16. The method of claim 15, further comprising chemically removing the mold after manually removing the mold.
17. The method of claim 11, further comprising annealing the electroless nickel layer.
18. The method of claim 11, wherein the electroless nickel layer comprises a composite layer consisting of electroless nickel and a reinforcement constituent chosen from the group consisting of silicon carbide, aluminum oxide, diamond particles, and polytetrafluoroethylene (PTFE).
19. A method comprising:
providing a substrate core;
depositing a dielectric layer over the core; and
patterning the dielectric layer using a microtool having an electroless nickel outer layer.
20. The method of claim 19, wherein patterning comprises pressing the microtool against the dielectric layer.
21. The method of claim 19, further comprising:

depositing a seed layer over the dielectric layer; and
electroplating the dielectric layer to form interconnects in the dielectric layer.

22. The method of claim 20, wherein pressing comprises using a pushing jig to press the microtool against the dielectric layer.

23. The method of claim 21, further comprising curing the dielectric layer.

24. The method of claim 21, wherein electroplating the dielectric layer comprises:
electroplating the dielectric layer with copper; and
planarizing the dielectric layer.

25. A microtool comprising:
a base portion including a pattern to pattern interconnects in a dielectric layer on a package substrate; and
an electroless nickel layer deposited over the base portion, the electroless nickel layer to increase an overall hardness of the microtool.

26. The microtool of claim 25, wherein the electroless nickel layer is less than 10 microns thick.

27. The microtool of claim 25, wherein the base portion comprises pure nickel.

28. The microtool of claim 25, wherein the electroless nickel layer comprises a composite including a reinforcement constituent chosen from the group consisting of silicon carbide, diamond particles, aluminum oxide, and PTFE.